MPLM REFERENCE DATA (CONTINGENCY)

JOINT ANGLES VS POR COORDINATES (CONTINGENCY)

MPLM GRAPPLE IN BAY (CONTINGENCY)

SY	SP	EP	WP	WY	WR
-2.0	+57.2	-89.4	-56.5	-30.6	-187.7

X	Y	Z	PITCH	YAW	ROLL	PL ID
-1059	-69	-457	270	310	151	0
-1106	0	-414	0	0	0	1
-992	0	-400	0	0	270	2
-1126	-3	-313	90	0	0	3

MPLM CLEAR V-GUIDES (CONTINGENCY)

SY	SP	EP	WP	WY	WR
-3.2	+59.8	-87.9	-59.9	-30.5	-186.2

X	Y	Z	PITCH	YAW	ROLL	PL ID
-1059	-69	-482	270	310	151	0
-1106	0	-439	0	0	0	1
-992	0	-425	0	0	270	2
-1126	-3	-338	90	0	0	3

MPLM LOW HOVER (CONTINGENCY)

SY	SP	EP	WP	WY	WR
-13.6	+63.4	-51.0	-94.3	-29.6	-174.3

X	Y	Z	PITCH	YAW	ROLL	PL ID
-1059	-69	-693	270	310	151	0
-1106	0	-650	0	0	0	1
-992	0	-636	0	0	270	2
-1126	-3	-549	90	0	0	3

MPLM HIGH HOVER (CONTINGENCY)

SY	SP	EP	WP	WY	WR
-40.0	+94.9	-67.7	+15.6	-41.7	-69.2

X	Y	Z	PITCH	YAW	ROLL	PL ID
-864	-57	-913	91	320	331	0
-910	-14	-982	1	0	90	1
-796	0	-980	1	0	0	2
-929	87	-979	91	90	0	3

MPLM PRE-INSTALL (CONTINGENCY)

SY	SP	EP	WP	WY	WR
-49.5	+103.0	-74.3	+9.5	-34.6	-77.0

X	Y	Z	PITCH	YAW	ROLL	PL ID
-812	-57	-913	91	320	331	0
-858	-14	-982	1	0	90	1
-744	0	-980	1	0	0	2
-877	87	-980	91	90	0	3

MPLM READY-TO-LATCH (CONTINGENCY)

SY	SP	EP	WP	WY	WR
-56.9	+106.8	-77.1	+5.7	-28.6	-82.2

X	Y	Z	PITCH	YAW	ROLL	PL ID
-781	-57	-913	91	320	331	0
-827	-13	-982	1	0	90	1
-713	1	-980	1	0	0	2
-846	88	-979	91	90	0	3

MPLM INSTALLED (CONTINGENCY)

SY	SP	EP	WP	WY	WR
-58.2	+107.3	-77.3	+5.0	-27.5	-83.0

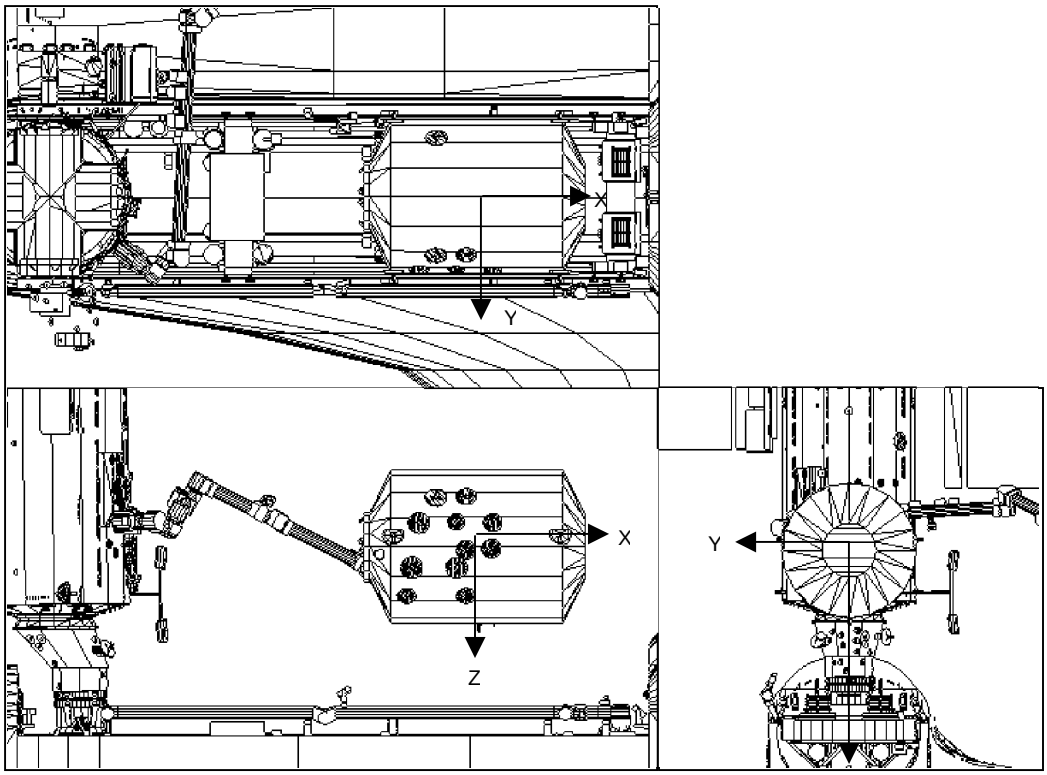
X	Y	Z	PITCH	YAW	ROLL	PL ID
-776	-57	-913	91	320	331	0
-822	-14	-982	1	0	90	1
-708	0	-980	1	0	0	2
-841	87	-980	91	90	0	3

MPLM CLEAR CBM GUIDES (CONTINGENCY)

SY	SP	EP	WP	WY	WR
-54.5	+105.7	-76.3	+6.8	-30.6	-80.5

X	Y	Z	PITCH	YAW	ROLL	PL ID
-790	-57	-913	91	320	331	0
-836	-14	-982	1	0	90	1
-722	0	-980	1	0	0	2
-855	88	-980	91	90	0	3

MPLM COORDINATE SYSTEM – PL ID 1 (CONTINGENCY)



POR: POR at centerline of fwd and aft trunnions during MPLM unberth

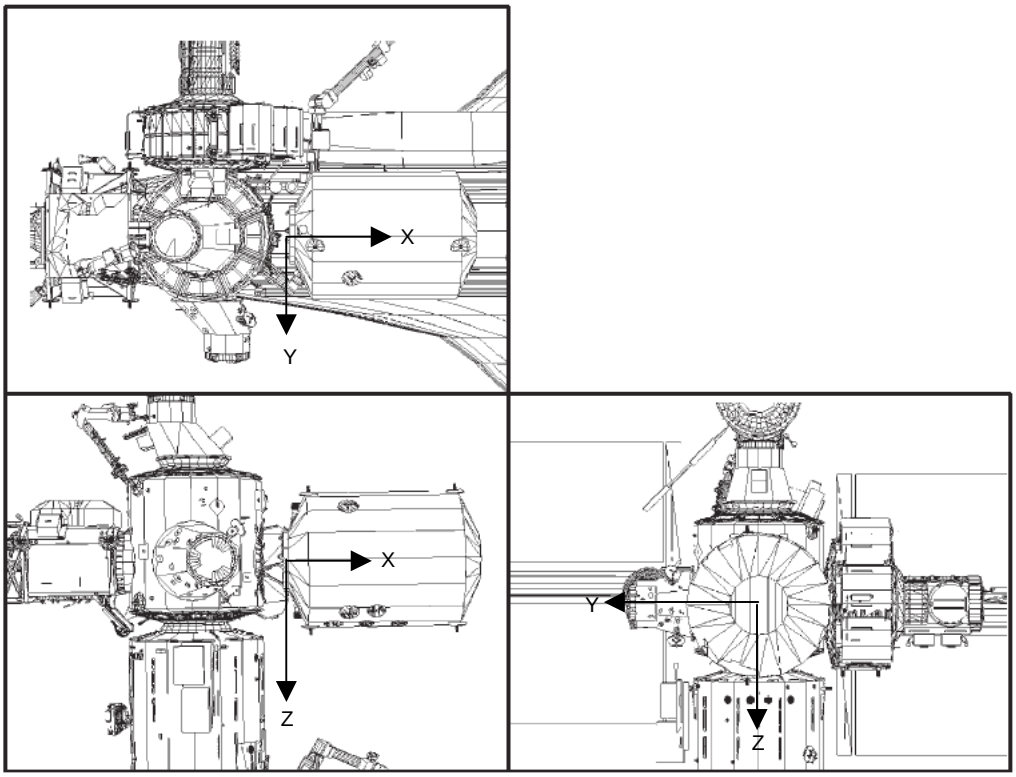
PURPOSE: MPLM unberth from payload bay

RATES:	COARSE	VERN
TRAN LIM ft/sec	0.10	0.05
ROT LIM deg/sec	0.22	0.11

NOTE

COARSE translational and rotational rates are equal to VERN rates and VERN rates equal one half original VERN rates

MPLM COORDINATE SYSTEM – PL ID 2 (CONTINGENCY)



POR: POR at CBCS target and aligned with CBCS camera view out Node nadir window

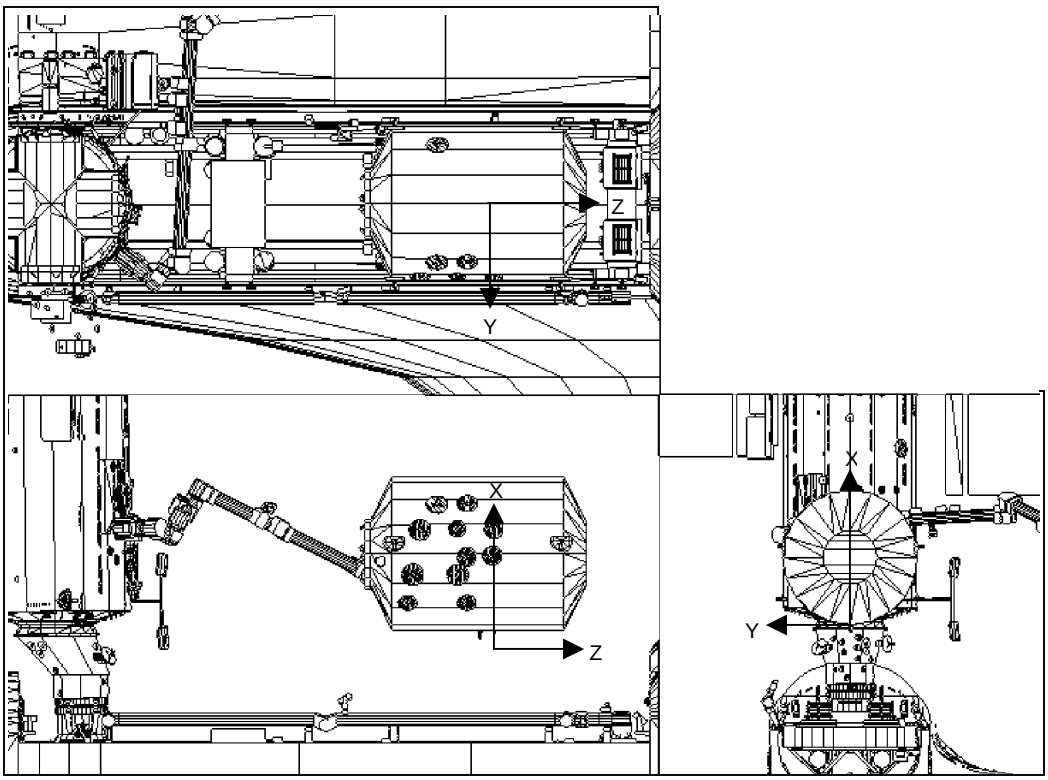
PURPOSE: MPLM mate to ISS NODE 1 nadir port

RATES:	COARSE	VERN
TRAN LIM ft/sec	0.10	0.05
ROT LIM deg/sec	0.22	0.11

NOTE

COARSE translational and rotational rates are equal to VERN rates and VERN rates equal one half original VERN rates

MPLM COORDINATE SYSTEM – PL ID 3 (CONTINGENCY)



POR: POR at MPLM keel target, aligned with view from aft keel camera

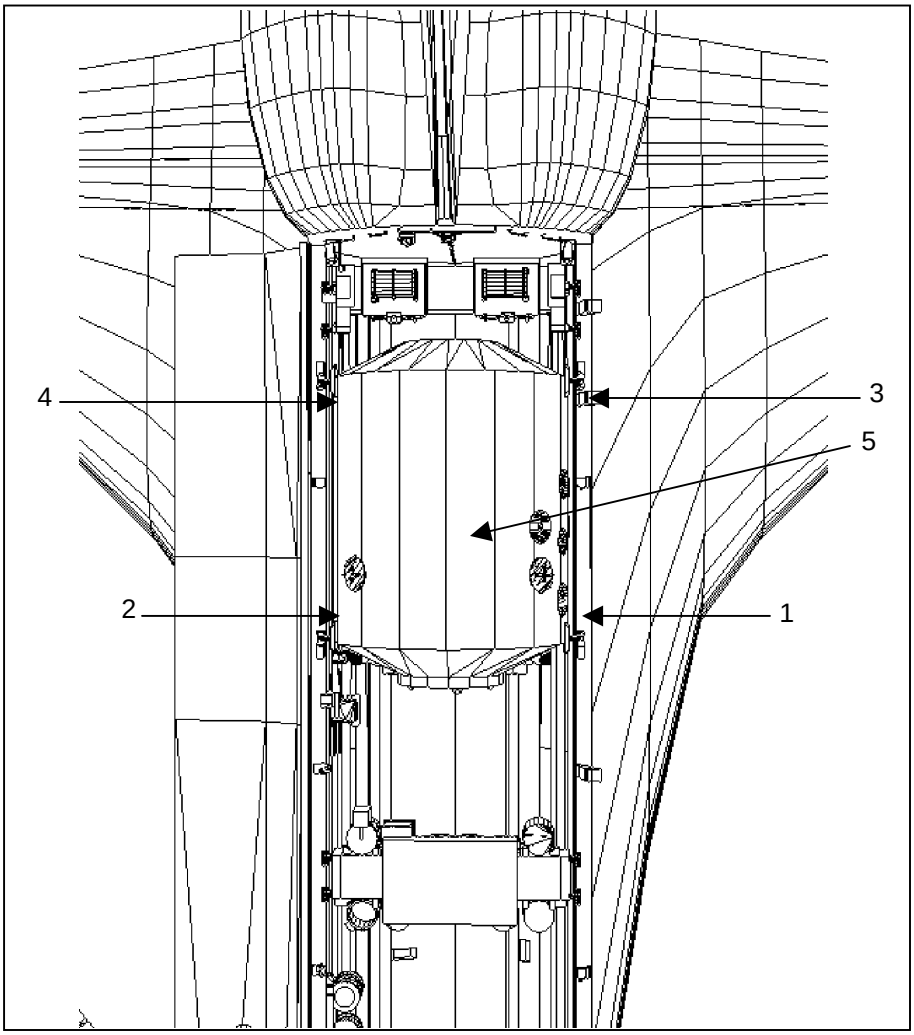
PURPOSE: MPLM berth in payload bay

RATES:	COARSE	VERN
TRAN LIM ft/sec	0.10	0.05
ROT LIM deg/sec	0.22	0.11

NOTE

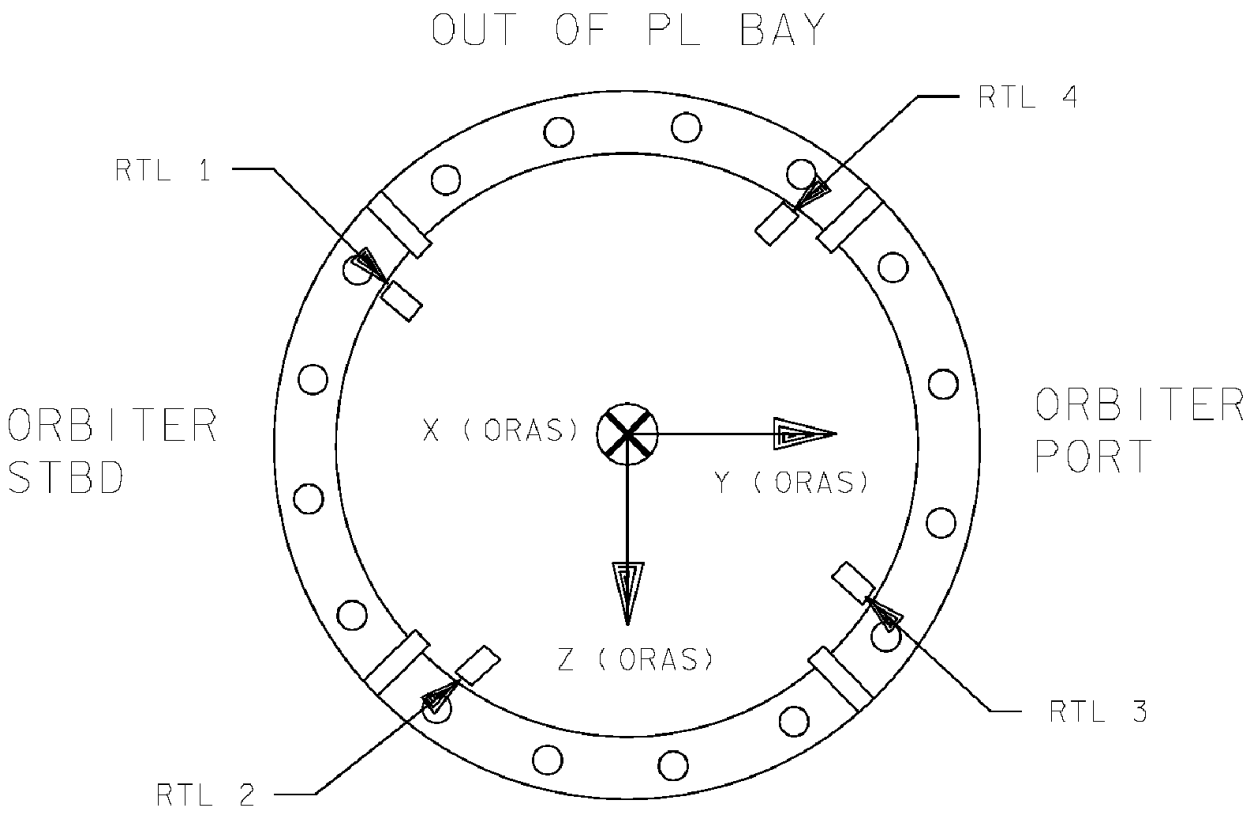
COARSE translational and rotational rates are equal to VERN rates and VERN rates equal one half original VERN rates

MPLM PRLA CONFIGURATION (CONTINGENCY)



OPENING SEQUENCE	PL SEL	REL
AKA	1	5
FWD PRLA	1	1,2
AFT PRLA	1	3,4

NODE 1 NADIR CBM RTL CONFIG FOR MPLM (CONTINGENCY)



NOTE: VIEW SHOWN IS FROM NODE 1 NADIR WINDOW

RMS/MPLM GO/NO-GO CRITERIA (CONTINGENCY)

CONTINUE OPS IF:	MPLM OPERATIONS (HIGH PRIORITY)	FLT RULE REF
SHOULDER BRACE REL (1)	0 ↓ [1]	
JETTISON SYSTEM (2)	1 ↓ [2]	A12-81
MPM STOW MOTORS (2)	2 ↓ [1]	A12-72
MRL LATCH CAPABILITY (3)	3 ↓ [3]	A12-73
MPM (4) STOWED IND (8)		
MPM (4) DEPLOY IND (8)	SH 1 ↓	A12-72
MRLs LATCHED (3)		
MAN AUG MODE (1)	3 ↓ [4]	A12-111
SINGLE MODE (1)		
DIRECT MODE (1)		
BACKUP MODE (1)		
BRAKES (6)	0 ↓	A12-115
AUTO BRAKES (1)	0 ↓ [5]	A12-116
CAPTURE & RIGIDIZE (2)	1 ↓	A12-161
DERIGIDIZE (2)	2 ↓	A12-161
RELEASE (2)	2 ↓	A12-161
BACKUP RELEASE (1)		
THERMAL (DEG F) -20(0), 176(172), LED -20(0), 147(144), ABE (EE) -20(0), 110(106), ABE (SPA)	REQD	A12-3

NOTES

[1] EVA CAPABILITY EXISTS FOR THE FOLLOWING CONTINGENCIES:
- SHOULDER BRACE RELEASE
- MPM DEPLOY/STOW
- RMS STRAPDOWN
- GRAPPLE FIXTURE (GF) RELEASE

[2] IFM IS AVAILABLE TO RECOVER JETTISON SYSTEM; HIGH PRIORITY RMS ACTIVITIES MAY CONTINUE

[3] CONTINUE OPERATIONS EVEN IF ONE FAILURE WILL RESULT IN INABILITY TO LATCH AT LEAST TWO MRLs (ASSUMES CURRENTLY HAVE TWO-LATCH CAPABILITY). EVA CAPABILITY REQD

[4] ONE OF SINGLE, DIRECT, OR BACKUP REQD FOR UNCRADLING

[5] OPERATIONS CAN CONTINUE IN DIRECT OR BACKUP WITH LOSS OF AUTO BRAKES. CAPTURE CAPABILITY DOES NOT EXIST IN BACKUP

SEE FLIGHT RULE {UF-1_12C-23}, MSS REDUNDANCY REQUIREMENTS [C] FOR CONTINGENCY CASES WHERE SRMS MAY PERFORM THESE OPERATIONS IF THE SSRMS IS NO-GO

SRMS/MPLM ATTITUDE CONTROL CONSTRAINTS (CONTINGENCY)

PAYLOAD POSITIONS	STS ATTITUDE CONTROL		ISS ATTITUDE CONTROL		
	VERN	ALT	CMG-TA		THRUSTERS ONLY
			MOM MGMT OR ATT HOLD	DESAT REQ	
MANEUVERING FROM MPLM BERTHED TO LOW HOVER					
– CLEARANCE < 2 FT			ALLOWED		
– CLEARANCE > 2 FT	[6]	[6]	ALLOWED	ENA	ALLOWED
AT MPLM LOW HOVER	A12	B12, LO Z	ALLOWED	ENA	ALLOWED
MANEUVERING FROM LOW HOVER TO PRE-INSTALL	[6]	[6]	ALLOWED	ENA	ALLOWED
AT MPLM PRE-INSTALL	A12	B12, LO Z	ALLOWED	ENA	ALLOWED
MANEUVERING FROM MPLM PRE-INSTALL TO MPLM INSTALL					
– CLEARANCE > 2 FT	[6]	[6]	ALLOWED	ENA	ALLOWED
– CLEARANCE < 2 FT			ALLOWED		
AT MPLM INSTALL AFTER CBM A-BOLTS COMPLETE	A12	B12, LO Z	ALLOWED	ENA	ALLOWED
MANEUVERING FROM MPLM PRE-INSTALL TO MPLM LOW HOVER	[6]	[6]	ALLOWED	ENA	ALLOWED
AT MPLM JETTISON	A12 [7]	B12, LO Z [7]	ALLOWED	ENA	ALLOWED

NOTES:
[1] KEY: ▭ THRUSTER FIRING NOT ALLOWED
[2] SRMS/PAYLOAD POSITIONS DEFINED IN REF DATA
[3] CONSTRAINTS APPLY TO BOTH BRAKES ON AND POSITION HOLD UNLESS OTHERWISE NOTED
[4] CONSTRAINTS NOT SHOWN IN THE TABLE ARE NOT ALLOWED
[5] REFERENCE RULE {A12.1.1-6}, OMS/RCS CONSTRAINTS, FOR USE OF AUTOMATIC ATTITUDE CONTROL IN UNPLANNED CONTINGENCY
[6] IF SRMS IS ALONG PLANNED TRAJECTORY WITH BRAKES ON OR POSITION HOLD, CLOSED-LOOP SHUTTLE ATTITUDE CONTROL IS PERMITTED. IN ADDITION, SRMS/MPLM MUST BE GREATER THAN 2 FT FROM STRUCTURE (5 FT FOR ALT)
[7] REAL-TIME UPLINK REQUIRED, IF USED